

What is claimed is:

1 1. A wavelength division multiplexing transmission system in
2 which a plurality of remote apparatuses are connected to a station
3 apparatus and communication is performed among said remote
4 apparatuses and the station apparatus, wherein each of said
5 remote apparatuses comprises wavelength determining means that
6 determines an available wavelength on the basis of an optical
7 signal received from said station apparatus.

1 2. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said wavelength determining means
3 determines the wavelength of an unreceived optical signal as
4 the available wavelength and sets the wavelength as a
5 transmission and reception wavelength to be used in said remote
6 apparatus.

1 3. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said wavelength determining means
3 determines the wavelength of a received optical signal as the
4 available wavelength and sets the wavelength as a transmission
5 and reception wavelength to be used in said remote apparatus.

1 4. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said station apparatus comprises
3 optical output control means that determines a wavelength to
4 be used, on the basis of an optical signal received from said
5 remote apparatus.

1 5. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said station apparatus prevents
3 an optical signal having the same wavelength as an unreceived
4 wavelength from being outputted and outputting an optical signal
5 having the same wavelength as a received wavelength.

1 6. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said wavelength determining means
3 comprises:

4 wavelength filtering means that sequentially separates
5 optical signals from an optical signal including a plurality
6 of wavelengths;

7 optical receiving means that outputs a reception status
8 signal indicating whether or not said separated optical signal
9 is being received;

10 wavelength control means that determines an unused
11 wavelength on the basis of said reception status signal, sets
12 said unused wavelength as a transmission and reception signal,
13 and outputs a wavelength control signal for setting said
14 wavelength; and

15 optical transmitting means whose output wavelength is
16 adjusted to be said unused wavelength in response to said
17 wavelength control signal.

1 7. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said station apparatus comprises:

3 wavelength demultiplexing means that demultiplexes the
4 wavelength of a received optical signal;

5 optical receiving means that receives an optical signal
6 demultiplexed by said wavelength demultiplexing means;

7 optical output control means that determines, as a
8 transmission wavelength, an optical signal having the same
9 wavelength as that of an optical signal received by said optical
10 receiving means;

11 optical transmitting means that transmits an optical signal
12 having the transmission wavelength determined by said optical
13 output control means; and

14 wavelength multiplexing means that multiplexes the
15 wavelength of the optical signal transmitted by said optical
16 transmitting means.

1 8. The wavelength division multiplexing transmission system
2 according to claim 1, wherein each of said remote apparatuses
3 and said station apparatus are connected with each other through
4 optical branching and coupling means.

1 9. The wavelength division multiplexing transmission system
2 according to claim 8, wherein said optical branching and coupling
3 means is an optical coupler.

1 10. The wavelength division multiplexing transmission system
2 according to claim 8, wherein said optical branching and coupling
3 means is wavelength demultiplexing and multiplexing means.

1 11. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said plurality of remote
3 apparatuses and said station apparatus are connected in a star
4 topology.

1 12. The wavelength division multiplexing transmission system
2 according to claim 1, wherein said plurality of remote
3 apparatuses and said station apparatus are connected in a tree
4 topology.

1 13. A remote apparatus in a wavelength division multiplexing
2 transmission system in which a plurality of remote apparatuses
3 are connected to a station apparatus and communication is
4 performed among said remote apparatuses and the station apparatus,
5 said remote apparatus comprising wavelength determining means
6 that determines wavelength determining means that determines
7 an available wavelength on the basis of an optical signal received
8 from said station apparatus.

1 14. The remote apparatus according to claim 13, wherein said
2 wavelength determining means determines the wavelength of an
3 unreceived optical signal as the available wavelength and sets
4 the wavelength as a transmission and reception wavelength.

1 15. The remote apparatus according to claim 13, wherein said
2 wavelength determining means determines the wavelength of a
3 received optical signal as the available wavelength and sets
4 the wavelength as a transmission and reception wavelength.

1 16. The remote apparatus according to claim 13, wherein said
2 wavelength determining means comprises:

3 wavelength separating means that sequentially separates
4 optical signals from an optical signal including a plurality
5 of wavelengths;

6 optical receiving means that outputs a reception status
7 signal indicating whether or not said separated optical signal
8 is being received;

9 wavelength control means that determines an unused
10 wavelength on the basis of said reception status signal, sets
11 said unused wavelength as a transmission and reception signal,
12 and outputs a wavelength control signal for setting said
13 wavelength; and

14 optical transmitting means whose output wavelength is
15 adjusted to be said unused wavelength in response to said
16 wavelength control signal.

1 17. A station apparatus in a wavelength division multiplexing
2 transmission system in which a plurality of remote apparatuses
3 are connected to the station apparatus and communication is
4 performed among said remote apparatuses and the station apparatus,
5 said station apparatus comprising optical output control means
6 that determines a wavelength to be used, on the basis of an optical
7 signal received from said remote apparatus.

1 18. The station apparatus according to claim 17, wherein said
2 station apparatus prevents an optical signal having the same

3 wavelength as an unreceived wavelength from being outputted and
4 outputting and optical signal having the same wavelength as a
5 received wavelength.

1 19. The station apparatus according to claim 17, comprising:
2 wavelength demultiplexing means that demultiplexes the
3 wavelength of a received optical signal;
4 optical receiving means that receives an optical signal
5 demultiplexed by said wavelength demultiplexing means;
6 optical output control means that determines, as a
7 transmission wavelength, an optical signal having the same
8 wavelength as that of an optical signal received by said optical
9 receiving means;
10 optical transmitting means that transmits an optical signal
11 having the transmission wavelength determined by said optical
12 output control means; and
13 wavelength multiplexing means that multiplexes the
14 wavelength of the optical signal transmitted by said optical
15 transmitting means.

1 20. A method for adding a remote apparatus to a wavelength
2 division multiplexing transmission system in which a plurality
3 of remote apparatuses are connected to the station apparatus
4 and communication is performed among said remote apparatuses
5 and the station apparatus, wherein an available wavelength is
6 determined on the basis of an optical signal received at a remote
7 apparatus to be added and the wavelength is set as a transmission

8 and reception wavelength to be used in said remote apparatus
9 to be added.